

# A vegetation map of the western Transvaal Bushveld

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## ABSTRACT

On the basis of a map of land-types (complexes of terrain-form, soil and climate), plant community complexes of the western Transvaal Bushveld were inferred and mapped at a 1: 250 000 scale. The syntaxonomy and synecology of the communities are summarized.

## RÉSUMÉ

### CARTE DE VÉGÉTATION DU BUSHVELD DE L'OUEST DU TRANSVAAL

Partant d'une carte des types de terres (complexes de formes de terrain, de sol et de climat), on en a déduit les complexes d'associations botaniques du Bushveld de l'ouest du Transvaal et on les a reportés sur une carte au 1:250 000e. On présente un résumé de la syntaxonomie et de la synécologie de ces associations.

## INTRODUCTION

In 1975 the first author started a vegetation survey at a semi-detailed scale of the western Transvaal Bushveld, using the Braun-Blanquet method (Van der Meulen, 1978; 1979). Twenty-two associations were described in terms of their floristic composition, structure and habitat. In the same area, another large survey, undertaken by the Soils and Irrigation Research Institute in Pretoria to inventorize physical resources for agriculture (*cf.* MacVicar *et al.*, 1974), was being carried out by Bruce and Schoeman (*pers. comm.*). They described land-types, a land-type being a unit of land with a specific recurrent pattern of terrain-form, soil and macro-climate. An investigation into the coordination of both types of survey is at present being undertaken (*cf.* Scheepers, 1978), the test area being the South Africa 1: 250 000 Topographical Sheet 2526 Rustenburg. This sheet covers the major part of the western Transvaal Bushveld survey area.

The correlation of plant communities with land-types was studied with the aid of aerial photographs and during field studies. The land-types proved to be useful in correlating vegetation with habitat and it was decided to map the vegetation of the 2526 Rustenburg Sheet, using the land-type map as a basis.

## THE AREA

The 1: 250 000 Topographical Sheet 2526 Rustenburg covers the area between 25° and 26° south latitude and 26° and 28° east longitude (Fig. 1). It comprises warmer, drier lowlands of the Bushveld Basin, lying at altitudes of 900-1 200 m and cooler, moister uplands to the south at 1 200-1 500 m elevation, gradually extending upwards on to the Highveld plateau further south. The lowlands are mainly underlain by igneous noritic and granitic rocks, but sediments crop out at several places. Soils are deeper fersiallitic sands to clays. Vertic clays occur on noritic

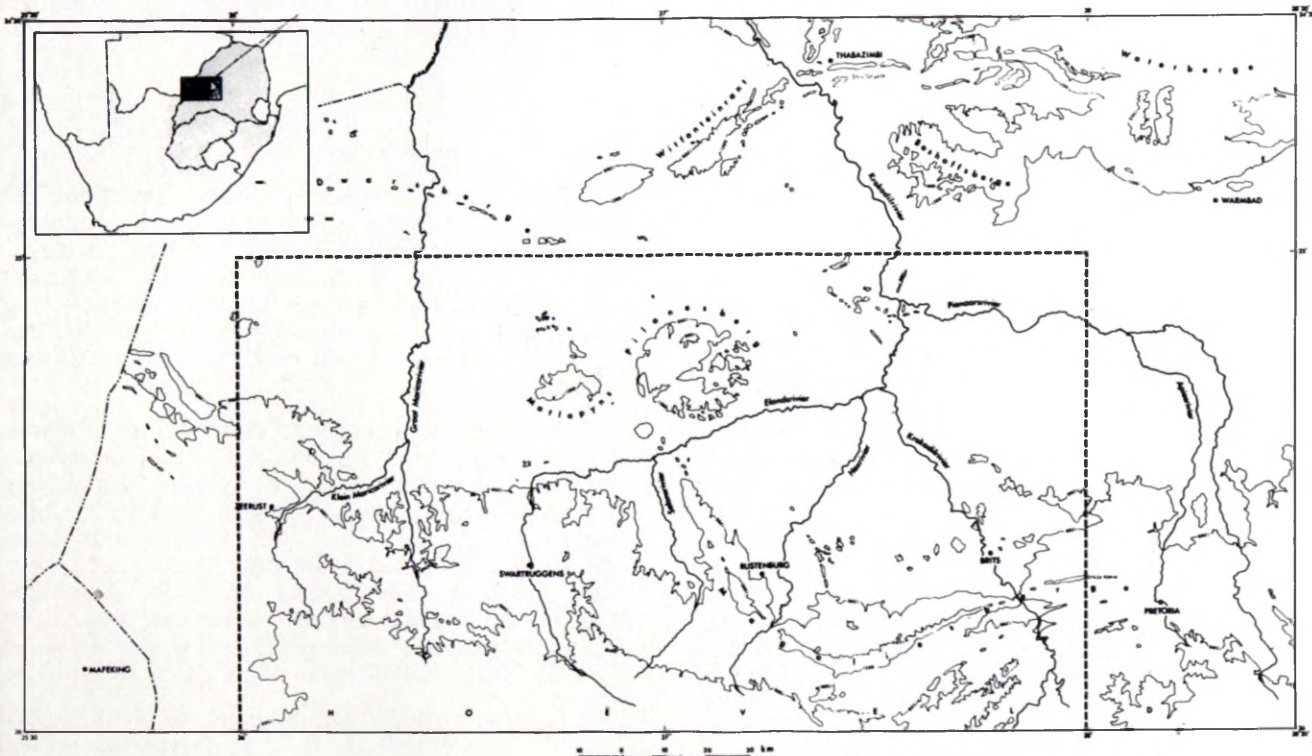


FIG. 1.—Topographical map of the western Transvaal showing the study area and the relative position of the 1: 250 000 Sheet 2526 Rustenburg.

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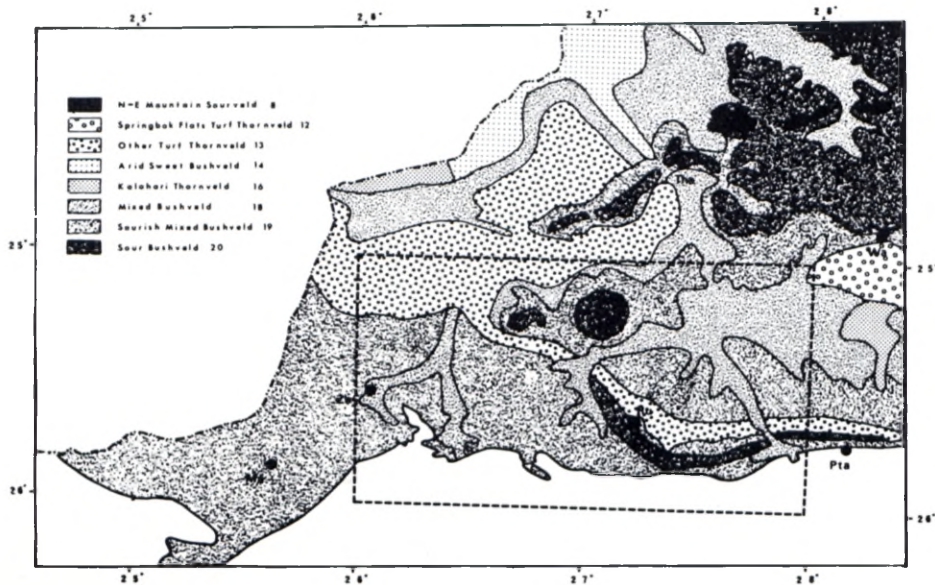


FIG. 2.—Acocks's veld types in the western Transvaal Bushveld. Note the 1 : 250 000 Sheet 2526 Rustenburg.

rocks. Granitic rocks give rise to gravelly sands, often with a plinthic horizon. Isolated rocky koppies are found throughout the Basin. The uplands mainly comprise alternating beds of quartzite and shale, cropping out as several series of north-facing dip slopes and steeper, south-facing scarp, talus and foot slopes, with associated bottomlands running parallel for long distances. The dip slopes and scarps are composed of quartzite, whereas the less-resistant shales tend to occupy the lower ground. Extrusive to intrusive andesitic rocks crop out extensively. Most soils are shallow and stony. Bedrock is frequently exposed at the surface.

In decreasing order of importance, the vegetation consists mainly of Acocks's (1975) Sourish Mixed Bushveld (19), Mixed Bushveld (18) and Other Turf Thornveld (13). Three mountainous areas, the Magaliesberg, the Pilanesberg and the Matlapynsberg, are excluded because they belong to Acocks's Sour Bushveld (20) (*cf.* Figs 1 & 2). Detailed information on the physiography of the area, the floristic composition, structure and habitat of the vegetation, on the phytogeographical affinities of the flora and on possible migration routes for certain species are given by Van der Meulen (1978; 1979) and Van der Meulen & Westfall (1978).

#### THE MAP

Since the land-type map only shows units with a specific combination of soil, terrain-form and macroclimate, it was not possible to use the land-types for the mapping of individual plant communities. The possibility that a land-type could accommodate a characteristic combination of associated plant communities was therefore investigated. Braun-Blanquet relevés were plotted on the land-type map. The floristic relationship, as determined by Van der Meulen (1979), between the relevés within a land-type was compared with that between different land-types. This proved to be a useful approach. Usually, a land-type included a characteristic combination of floristically closely related communities. Thus, inferring from the land-type map, ecologically meaningful plant-community complexes could be mapped (Fig. 3).

To indicate that the boundaries on the map are tentative, broken lines were used. Boundaries were usually taken from the land-type map, unless there was

no clear correlation between a land-type and a plant-community complex. For example, on the granite portion of the Bushveld Igneous Complex (immediately to the east of the Pilanesberg), the land-type map showed several different land-type units, each of which did not accommodate its own group of associated plant communities. Hence, this area comprises one mapping unit on the vegetation map. When a land-type was found to accommodate communities which were floristically markedly different, an additional boundary (—.—.—) was sketched. An example is found to the east of Swartruggens. Here, within one land-type, mesic vegetation of upland sites merges into more xeric, floristically different vegetation of lowland areas. Owing to pronounced relief, the mapping units of the uplands include a greater variety of associated plant communities than those of the lowlands. In the legend, for each mapping unit the individual plant communities are given in order of importance.

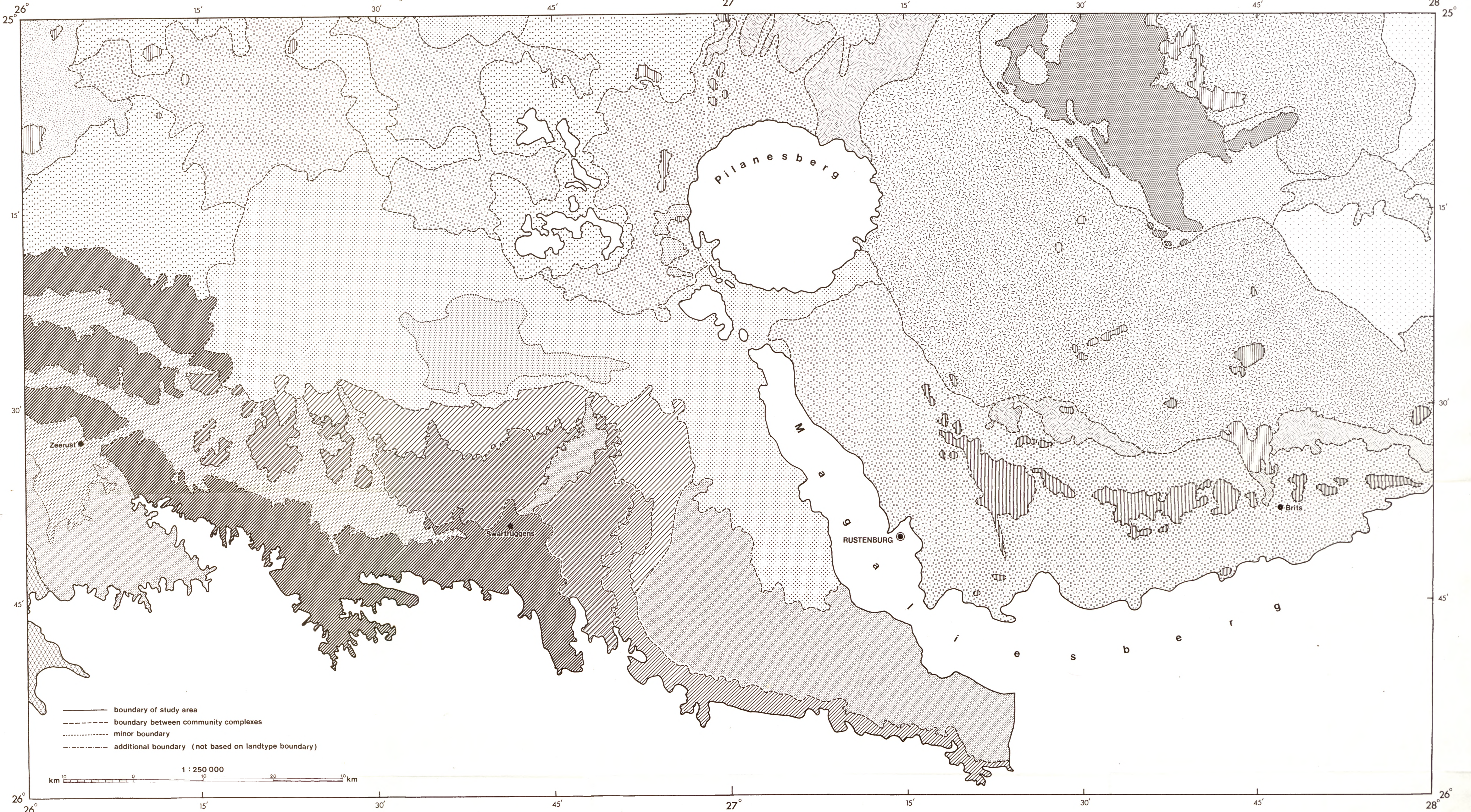
#### THE PLANT COMMUNITIES

Complexes of associated plant communities are mapped in Fig. 3. The syntaxonomy and synecology of the communities are summarized in Table 1. Using the map in combination with this table will give an idea of the various kinds of habitats and associated plant communities which occur in a particular land-type. Four broad vegetation-habitat classes are recognized:

(i) Microphyllous thornveld communities of warm, dry lowlands are grouped into the *Acacia tortilis*-*Panicum maximum* Woodland Order, comprising several alliances and associations. Floristic differences between the minor syntaxa are mainly determined by differences in soil properties. The thicket-like *Acacia tortilis*-*Carissa bispinosa* Woodland Alliance on diabase dykes and termite mounds, is found on small areas throughout the Basin. However, the size of these areas is too limited to map.

(ii) Mesophyllous communities of cool, moist uplands are described as the *Combretum molle*, *Diheteropogon amplexans* Woodland Order. Altitude, aspect and soil texture are the main habitat factors determining the distribution of the various minor syntaxa.





## VEGETATION OF THE WESTERN TRANSVAAL BUSHVELD

Microphyllous, thorny woodland of warmer, drier lowlands

- Acacia tortilis* — *Aristida bipartita* Woodland Association (1)
- Acacia tortilis* Woodland Association (3.2)
- Acacia tortilis* Woodland Association (3.2) (mainly stony soils)
- Acacia erioloba* — *Acacia fleckii* Woodland Association (3.5)
- Acacia tortilis* Woodland Association (3.2)
- Acacia erubescens* Woodland Association (3.1)
- Acacia tortilis* Woodland Association (3.2)
- Acacia luederitzii* — *Boscia albitrunca* Woodland Association (3.4)

Transitional woodland and areas not studied in detail

- Acacia tortilis* — *Tragus racemosus* Woodland Association (4.1)
- Rhus lancea* — *Brachiaria serrata* Woodland Association (4.2)
- Rhus lancea* — *Brachiaria serrata* Woodland Association (4.2)
- Acacia tortilis* — *Tragus racemosus* Woodland Association (4.1)
- Olea africana* — *Stipagrostis uniplumis* Woodland Association (5.2)
- Faurea saligna* — *Rhynchelytrum setifolium* Woodland Alliance (8)
- Burkea africana* — *Perotis patens* Woodland Alliance (7)
- Combretum apiculatum* Woodland Association (6.2)
- Croton gratissimus* — *Setaria lindenberghiana* Woodland Association (6.1)
- Other vegetation

Mesophyllous woodland of cooler, moister uplands

- Ochna pulchra* — *Terminalia sericea* Woodland Association (7.2)
- Croton gratissimus* — *Canthium gilfillanii* Woodland Association (7.1)
- Faurea saligna* — *Rhynchelytrum setifolium* Woodland Alliance (8)
- Rhus lancea* — *Brachiaria serrata* Woodland Association (4.2)
- Ochna pulchra* — *Terminalia sericea* Woodland Association (7.2)
- Faurea saligna* — *Rhynchelytrum setifolium* Woodland Alliance (8)
- Ochna pulchra* — *Terminalia sericea* Woodland Association (7.2)
- Croton gratissimus* — *Canthium gilfillanii* Woodland Association (7.1)
- Rhus lancea* — *Brachiaria serrata* Woodland Association (4.2)
- Bequaertiodendron magalismontanum* — *Nuxia glomerulata* Shrubland Sub-alliance (8.3 & 8.4)
- Croton gratissimus* — *Canthium gilfillanii* Woodland Association (7.1)

In lowlands

- Croton gratissimus* — *Setaria lindenberghiana* Woodland Association (6.1)
- Acacia caffra* — *Bewisia biflora* Woodland Association (8.1)
- Combretum apiculatum* Woodland Association (6.2)
- Acacia caffra* — *Bewisia biflora* Woodland Association (8.1)
- Croton gratissimus* — *Setaria lindenberghiana* Woodland Association (6.1)
- Ochna pulchra* — *Terminalia sericea* Woodland Association (7.2)
- Acacia erioloba* — *Acacia fleckii* Woodland Association (3.5)
- Combretum apiculatum* — *Eragrostis nindensis* Woodland Association (7.3)
- Spirostachys africana* — *Sporobolus ioclados* Woodland Association (3.3)

FIG. 3.—Vegetation map of the western Transvaal Bushveld showing plant community complexes.



TABLE 1.—Summary of syntaxonomy and synecology of communities in the western Transvaal Bushveld (cf. Van der Meulen, 1979)

Syntaxon	Broad habitat characterization
<i>Acacia tortilis</i> — <i>Panicum maximum</i> Woodland Order.....	warm, dry lowlands.
<i>Acacia tortilis</i> — <i>Aristida bipartita</i> Woodland Association (1).....	black, vertic clays.
<i>Acacia tortilis</i> — <i>Carissa bispinosa</i> Woodland Alliance (2).....	diabase dykes and termite mounds.
<i>Acacia mellifera</i> — <i>Schmidtia pappophoroides</i> Woodland Alliance (3).....	sands to clays.
<i>Acacia erubescens</i> Woodland Association (3.1).....	sandy to stony soils on ferro-gabbro.
<i>Acacia tortilis</i> Woodland Association (3.2).....	clayey soils.
<i>Spirostachys africana</i> — <i>Sporobolus ioclados</i> Woodland Association (3.3).....	solonetzic. clayey soils in depressions.
<i>Acacia luederitzii</i> — <i>Boscia albitrunca</i> Woodland Association (3.4).....	deep (aeolian) sands.
<i>Acacia erioloba</i> — <i>Acacia fleckii</i> Woodland Association (3.5).....	deep sands.
Transitional Woodland.....	lower slopes and bottomlands, calcareous substrates.
<i>Acacia tortilis</i> — <i>Tragus racemosus</i> Woodland Association (4.1).....	clayey, often disturbed sites in bottomlands.
<i>Rhus lancea</i> — <i>Brachiaria serrata</i> Woodland Association (4.2).....	eutrophic lithosols on lower slopes.
<i>Tarchonanthus camphoratus</i> — <i>Fingerhuthia africana</i> Woodland Alliance.....	calcareous substrates.
<i>Olea africana</i> — <i>Stipagrostis uniplumis</i> Woodland Association (5.2).....	sandy, base-rich, dolomitic lithosols.
<i>Combretum molle</i> — <i>Diheteropogon amplexans</i> Woodland Order.....	cool, moist uplands.
<i>Croton gratissimus</i> — <i>Setaria lindenbergiana</i> Woodland Association (6.1).....	bouldery, warm slopes of koppies.
<i>Combretum apiculatum</i> Woodland Association (6.2).....	warm, stony hillsides of koppies.
<i>Burkea africana</i> — <i>Perotis patens</i> Woodland Alliance (7).....	warm, rocky slopes and deeper, leached sands.
<i>Croton gratissimus</i> — <i>Canthium gilfillanii</i> Woodland Association (7.1).....	rocky sites.
<i>Ochna pulchra</i> — <i>Terminalia sericea</i> Woodland Association (7.2).....	deeper, leached sands.
<i>Combretum apiculatum</i> — <i>Eragrostis nindensis</i> Woodland Association (7.3).....	gravelly (plinthic) sands on granite.
<i>Faurea saligna</i> — <i>Rhynchelytrum setifolium</i> Woodland Alliance (8).....	cool, rocky slopes and steep rock faces.
<i>Acacia caffra</i> — <i>Bewsia biflora</i> Woodland Association (8.1).....	clayey lithosols on southern slopes.
<i>Protea caffra</i> — <i>Eragrostis racemosa</i> Woodland Association (8.2).....	summit areas.
<i>Bequaertiodendron magalismontanum</i> — <i>Nuxia glomerulata</i> Shrubland Sub-alliance...	steep rock faces.
<i>Clutia pulchella</i> — <i>Brachymeris athanasioides</i> Shrubland Association (8.3).....	scarps and bouldery outcrops.
<i>Ficus ingens</i> — <i>Plectranthus madagascariensis</i> Shrubland Association (8.4).....	crags and cliffs in riverine kloofs.
<i>Combretum erythrophyllum</i> — <i>Celtis africana</i> Forest Alliance (9).....	riparian.
<i>Diospyros whyteana</i> — <i>Myrsine africana</i> Forest Association (9.1).....	riverine kloofs.
<i>Combretum erythrophyllum</i> — <i>Acacia karroo</i> Forest Association (9.2).....	deep alluvium on river banks.

(iii) Transitional woodland has species of both xeric lowland bushveld and mesic upland bushveld. It occurs on lower slopes and bottomlands and on calcareous substrates. A hilly area to the north-east of the Pilanesberg, near the junction of the Krokodil and Pienaars Rivers, was not studied in detail and is provisionally grouped with this class.

(iv) Azonal riparian forest vegetation (described in the *Combretum erythrophyllum*—*Celtis africana* Forest Alliance) is not indicated on the map, because it occurs in most of the mapping units as narrow strips on river banks and in riverine kloofs.

#### ACKNOWLEDGEMENTS

Messrs R. W. Bruce and J. Schoeman of the Soils and Irrigation Research Institute kindly provided all the information on the land-types. Miss M. Visser drew the figures.

#### UITTREKSEL

*Plantgemeenskap-komplekse van die westelike Transvaalse Bosveld is aan die hand van 'n 1:250 000 landtipekaart (terreinvoorm, grondsoort en klimaat) bepaal en gekarteer. Die sintaksonomie en sinekologie van die gemeenskappe word opgesom.*

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